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The influence of possession on the movement and physical demands in adolescent rugby union match-play

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Activity & Leisure

Dale Read, Ben Jones & Kevin Till

Ball out
of Play
(BOP)

Phases of Play in Rugby

Attacking

Defending

Locomotion

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Collisions
(tackles, rucks, mauls, scrums)

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The movement characteristics of English Premiership rugby union players

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Cahill et al. *JSS*. 2013;31(3):229-237.

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Original research

Positional demands of international rugby union: Evaluation of player actions and movements

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Quarrie et al. *JSAMS*. 2013;16(4):353-359.

RESEARCH ARTICLE

Movement Demands of Elite U20 International Rugby Union Players

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Cunningham et al. *PLoSOne*. 2016;11(4).

- Rehabilitation
- Recovery
- Player development
- Physical preparation

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*Train for the average demands –
unprepared for the most demanding passages of play – Tim Gabbett*

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Aim: To quantify the demands of attacking, defending and ball out of play.

Purpose: To establish the most demanding phase of play (attacking vs. defending) for forwards and backs.

Methods

- 1 Regional academy
- 12 matches (2014/2015 & 2015/2016 season)
- 59 male rugby union players [259 observations]
- Split into forwards ($n = 28$ [150]) and backs ($n = 31$ [109])
- Age: 17.6 ± 0.6 years
- Stature: 183.0 ± 6.8 cm
- Body mass: 89.4 ± 10.9 kg

Analysed video recordings for attacking, defending and ball out of play timings

Inertial sensors

Gyroscopes:
Measure the orientation of the athlete's body position.

Accelerometers:
Measure impact forces.

Magnetometers:
Measure direction like a digital compass.

10 Hz global positioning system (GPS)
100 Hz accelerometer, gyroscope and magnetometer

(RD) Relative distance ($\text{m} \cdot \text{min}^{-1}$)
(PL) PlayerLoad™ per minute ($\text{AU} \cdot \text{min}^{-1}$)

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Statistical Analysis

- Linear mixed model
 - Random: 'players code' and 'match code'
 - Fixed: 'phases of play' (attack, defence, ball out of play)
- SWC established for each variable (0.2 between-subject standard deviation) – (RD = 4.7%; PL = 4.9%)
- Magnitude based inferences calculated and assessed as:
 - 25-75% *Possibly*
 - 75-95% *Likely*
 - 95-99.5% *Very Likely*
 - >99.5% *Almost Certainly*
 - 'Unclear' when crossing the upper and lower bound of the SWC
 - Differences shown as percentage change $\pm 90\%$ confidence limits

Results

	Match Length		
Time (mins)	74.8 ± 3.3		
	Ball in play		Ball out of play
Time (mins)	27.4 ± 2.9 (37%)		47.4 ± 4.1 (63%)
	Attacking	Defending	Ball out of play
Time (mins)	12.7 ± 3.1 (17%)	14.7 ± 2.5 (20%)	47.4 ± 4.1
Cycles (<i>n</i>)	27 ± 9	31 ± 10	48 ± 3
Average Cycle Time (s)	26 ± 17	26 ± 18	59 ± 33
Minimum Cycle Time (s)	7	7	9
Maximum Cycle Time (s)	96	113	259

Forwards vs. Backs (RD)

Forwards vs. Backs (RD)

Forwards vs. Backs (PL)

Relative Distance

PlayerLoad™

Key Findings

Movement demands in attack are unclear between forwards and backs

Movement demands in defence are harder for forwards than backs

Movement demands are higher in backs than forwards when the ball is out of play

PlayerLoad is higher in forwards than backs in all 3 phases of play (suggesting they are involved in more collisions / static exertions)

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Attacking and defending are similar for forwards

Attacking is harder than defending for backs

HOW TO USE IT?

Worst case scenario protocol

PLAYER INVOLVEMENTS / DEVELOPMENT

12-15 mins of attacking or defending can be replicated in 30 mins of training

CONTEXT

$70 \text{ m}\cdot\text{min}^{-1}$ to $117 \text{ m}\cdot\text{min}^{-1} = 2 \text{ m}\cdot\text{s}^{-1} / 7 \text{ km}\cdot\text{h}^{-1}$. Consider the decision making, change of direction, communication, technical rugby skill, scrums, etc

RUNNING GAME FOR BACKS?

Future studies should analyse match-play data using a similar method
Locomotor data split into velocity zones would enhance the understanding

Leeds Beckett University

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